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The North American Chrysididae

S. Frank Aaron

The North American CHRYSIDIDÆ.

BY S. FRANK AARON.

The materials upon which this monograph is based are the almost perfect collections of the American Entomological Society, containing the types of Messrs. Cresson and Norton, together with a large number of undescribed forms, and the collection of M. Provancher, of Canada, kindly loaned me for study, containing all his type specimens described in the "Naturaliste Canadien," with other rare and interesting species. Only four species treated of in the following pages are wanting in the material at hand, and furthermore I had the advantage of having Mr. Norton's determinations of many species in his paper now in the Society's collection. More than four times the material has since then been added to the collection.

I believe that there is generally a strong separation between the fauna of the United States and that of Mexico and the Antilles, and I have described only those forms found in America North of Mexico. An examination of a number of Cuban forms belonging to several genera convinced me that there is a slight, but constant difference, in that the Cuban specimens have the thorax rich, light emerald-green, with brassy reflections and without blue, while the abdomen is more or less deep blue and purple with some green reflections. Color is of very slight importance in the separation of species, but the absolute contrast of color upon different parts of the same insect, together with its being constant in individuals, alters the case in favor of specific distinction. For this reason I have left certain Cuban species heretofore considered equal to a few of our species out of the synonymy. I have also erected four sub-families much after the manner of Dahlbom's families.

It has been my purpose not only to give diagnostic descriptions of genera and species, but in the descriptions of each form to mention the inconstant or gradational variations of individuals in order that students may readily appreciate absolute and constant differentiation. This has been rendered the more certain by the large material at hand. I have endeavored to avoid mentioning characters common to every individual in the family, and have for the most part noticed these characters in the following description.

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Colors always metallic and shining, extending upon the scape and sometimes one or two of the following antennal joints and upon the femora and tibiæ. Articles of the antennæ beyond the scape to the apex, and also the tarsi, dull brown, the latter sometimes luteous. Head, thorax and abdomen covered, or partly covered, with more or less distinct punctures, which are generally largest upon the metathorax, and becoming large, shallow, foveolæ on each side of the metanotum. Scape, tegulæ and the femora and tibiæ with generally fine indications of the punctures; three distinct ocelli; antennæ with thirteen articles; tarsi with five articles, the basal one long, the others very short, subequal; wings hyaline, generally more or less tinted with dark colors; mesothorax with two longitudinal sutures dividing it into three equal parts; posteriorly on each side of the metanotum a produced, pointed, triangular spine, in a few specimens these are only indicated by obtuse angles. When the tergum is bent the extreme base of the second and third segments expose black or purple colors.

No doubt but that exception will be taken to the manner in which I have separated and amalgamated genera and species, but I have in every instance endeavored to reconcile the inferences drawn with the principles of natural classification.

The detailed figures illustrate the important described differences in the forms. For this purpose a powerful but large magnifying glass was used, and great care was exerted to render them accurate.

SUB-FAMILIES.

Face entirely convex. Prothorax as long, or longer than wide, and longer than the mesothorax, with a distinct arched suture crossing its anterior portion. Metanotum almost equally elevated with the other portions, giving the dorsum of the thorax the appearance from above of four distinct parts except the prothorax. Abdomen convex beneath, the lateral margins not extending beyond the surface of the venter. Segments of the tergum 4 and 5..... **Cleptinæ.**

Face more or less concave (a receptacle for the scape or long basal joint of the antennæ). Prothorax much wider than long, suboblong, always shorter than the mesothorax. Metanotum beneath the postscutellum at an angle 90°, giving the dorsum of the thorax the appearance from above of 3 distinct parts, excepting the prothorax. Abdomen concave beneath, caused by the lateral margins extending beyond the surface of the venter. Segments of the tergum 3, except in the ♂ of Parnopes, which has 4.

"Maxillæ and labium ordinary, ligula subconical" (not produced) "exterior process of maxillæ rounded, obtuse." [Dahlbom.]

Third abdominal segment without submarginal groove, declivity, or series of pits interrupting the evenness of its entire surface. Discoidal cellule wanting, or formed only by dark colored indications of the nervures. **Elampinæ.**

Third abdominal segment with a submarginal series of more or less deep and rounded pits or broad foveolæ, contained in a groove or declivity, which causes the surface of the marginal area to be uneven with and below the general surface of the segment. Discoidal cellule (except in *C. verticalis* Patton, and therefore generally) formed by the absolute nervures and entirely closed.....**Chrysidinæ.**

" Maxillæ and labium abnormal, ligula and process of maxillæ very long, extended into a slender filiform beak, resembling the proboscis of Bees, bent back under the thorax in repose." [Dahlbom] Discoidal cellule formed only by indications of the nervures, a broad deep submarginal groove on each side of the apical half of the last segment of the tergum, without pits. Segments of abdomen, ♂ 4, ♀ 3.....**Parnopinæ.**

Sub-family—CLEPTINÆ.

CLEPTES Latr.

Gen. Cr. et Ins. iv, 44.

Color metallic green, blue, or purple, or with reflections of all these colors.

Head and thorax the same general color as the abdomen.

General color of the body blue, with purple and green reflections, femur dull, with little of the metallic color of the body, tibia with little or no metallic, about as in the tarsi. Wings evenly infuscated.....**purpurata.**

General color of the body emerald-green, with little or no purple or blue, except on the postscutellum. Femur and tibia strongly colored with metallic green, in contrast with the tarsi, which is luteous at base, fuscous apically. Wings subhyaline.

Face and abdomen with golden reflections.....**aliena.**

Face and abdomen without distinct golden reflections.....**insperata.**

Head and thorax green, the abdomen metallic black with some slight green, purple and blue reflections.....**Provancheri.**

Color elegant metallic ruby and golden with some green (appearing generally red). **speciosa.**

Cleptes purpurata Cresson, Trans. Am. Ent. Soc. vii, 1878–79, Monthly Proc. p. 10, May, 1879.

Cleptes americana Cresson, loc. cit.

The collection contains five specimens of the larger form (*purpurata*) 7–6 mm. long, from Vancouver's Island (Mr. Cresson's type), Washington Territory and Southern California; nine specimens of the smallest form (*americana*), 5.5 mm. long from Nevada, and three specimens of the amalgamating form, intermediate in size, from Washington Territory. Otherwise all these forms do not differ. ♂. ♀.

Cleptes aliena Patton, Can. Ent. vol. xi, p. 66, April, 1879.

There is one male specimen from Montana in the collection which agrees with Mr. Patton's description almost exactly, except that the tarsi are luteous, fuscous only at the apex, the posterior tibiæ only, with black

on the inside, and the color is probably less blue, with a little stronger golden reflection. I feel very positive that this specimen, together with a series to show the variations, will prove identical with Patton's *aliena*.

Cleptes Provancheri Aaron. *Cleptes americana* (name preoccupied) Provancher, Nat. Can. xii, 304, July, 1881.

Before me are seven specimens ♂ ♀ from Canada (two specimens, one of which is Provancher's type), Colorado and Washington Territory 5–6 mm. long.

The color is emerald-green on the head and thorax with or without bluish reflections; abdomen blackish shining, with green reflections on the margins. Wings subhyaline, tibia with some greenish reflections outwardly; otherwise, and with the tarsi, varying from luteous to fuscous. Almost necessarily M. Provancher's *americana* must fall, Mr. Cresson having used that name in 1879.

Cleptes insperata n. sp.—Emerald-green, with more or less slight blue and purple reflections, rather sparsely and evenly punctured. Wings subhyaline on the centre, in places infumated. Tarsi luteous, rest of legs largely green outwardly; 6–6.5 mm. long. ♀.

Montana, four specimens; between *purpurata* and *aliena*.

Cleptes speciosa n. sp.—Elegantly colored with ruby, golden and green, the metanotum emerald-green with a slight bluish reflection, evenly and sparsely punctured, smoothest on the scutellum; abdomen black, shining on the disc, with the metallic reflections broadly on the sides and the whole of the fourth segment; wings subhyaline, or infumated; femora metallic (the anterior pair purplish in one specimen), tibia and tarsi luteous, fuscous at base and apex in one specimen; first joint of antennæ with purplish reflection; 5 mm. long. ♀.

Montana, two specimens. An elegant and very distinct species.

Sub-family—ELAMPINÆ.

Tarsal claw with 2–6 distinct teeth between the base and apex.

The apical margin of the third abdominal segment is simply notched, rounded, not produced as seen laterally ..... **Omalus.**

The apical margins of the third abdominal segment pinched on each side of the notch or emargination, forming, as viewed laterally, a snout-like projection that appears truncated.

The emargination or notch of the apex open, not filled up with a membrane.

The surface of the third segment above the apical snout-like projection even, not produced ..... **Elampus.**

The surface of the third segment just above the snout-like projection produced into a cone shaped piece forming the direct apex of a fold which extends on each side just above the apical and lateral margins. **Diplorrhos.**

The emargination or notch of the apex closed, or partly filled up by a membrane, which is excised beneath ..... **Notozus.**

The apical margin of the third abdominal segment entire or broadly sinuate. **Holopyga.**

Tarsal claw with one small perpendicular tooth in the middle. **Hedychridium.**

Tarsal claws bifid at the apex, without inner teeth..... **Hedychrum.**

OMALUS Jurine.

Nouv. Meth. Classer les Hym. 300, 1807.

The occiput, disc of prothorax and mesothorax smooth, or with slight indications of punctures; front, anterior and lateral margins of prothorax, sides and the metathorax strongly punctured; postscutellum rounded, not projecting; abdomen smooth, with sparse, very fine punctures; apical margin of third segment rounded, notched; 2–6 teeth within the tarsal claw.

Two teeth within the tarsal claw, median lobe of mesothorax not strongly punctured posteriorly.

Margin of third abdominal segment semi-transparent yellowish, broadest at apex..... **iridescens.**

Margin of third abdominal segment not semi-transparent yellowish, but concolorous with the segment.

Smoothed areas metallic blackish (the color of antique bronze), without purple reflections; apical corners of second abdominal segment not projecting beyond, but even with the base of third segment..... **diversus.**

Smoothed areas blue and green, with purple reflections; apical corners of second abdominal segment projecting beyond the base of third segment. **læviventris.**

Three to six teeth within the tarsal claw, median lobe of mesothorax not strongly punctured posteriorly.

Lateral margins of third abdominal segment straight or unisinuate, apex on each side of notch rounded, not produced beyond line of margin, notch not forming a perfect semi-circle, but subangulated.

Notch as deep as broad, angle less than 90°..... **sinuosus.**

Notch much wider than deep, angle over 90°..... **corruscans.**

Lateral margins of third abdominal segment bisinuate, the apex on each side of the notch pointed, somewhat produced beyond the line of margin; notch forming a semi-circle..... **semicircularis.**

Omalus iridescens.

Elampus iridescens Norton, Trans. Am. Ent. Soc. vii, p. 234, 1879.

Elampus marginatus Provancher, Nat. Can. xii, 304, 1881.

Eight specimens from Canada (Provancher's types), New Hampshire, Pennsylvania and Colorado. They are all perfectly identical, except varying in size from 3.5–4.5 mm.

Omalus diversus n. sp.—Without purple reflections, head and thorax with the smoothed areas blackish, shining, the color of antique bronze, punctured areas green; median lobe of mesothorax not strongly punctured posteriorly; abdomen polished, with green and slightly blue reflections on the lateral margins;

third segment with its lateral margins short, a little sinuate, notch as deep as broad, its angles less than 90°; 2 teeth in claw; 4 mm. long. ♀.

California, one specimen.

Omalus læviventris Cresson, Proc. Ent. Soc. Phila. iv, 303, 1865.

Elampus lœviventris Norton, Trans. Am. Ent. Soc. vii, p. 234, var. *cyanescens.*

Elampus cyanescens Provancher, Nat. Can. xii, p. 303, 1881.

From Colorado (Mr. Cresson's type), California, New Hampshire and Canada; also the type of *cyanescens*, in M. Provancher's collection, from Canada. Three specimens from Colorado are larger than the type, one specimen intermediate. One specimen from California is darker, no green except on the face, and a slight reflection on the abdomen, intermediate in size. Three specimens from Canada and two from New Hampshire also grade in size, and vary slightly in depth of color, and have the lateral margins of third segment less sinuate, with the notch not as deep; these constitute the var. *cyanescens;* thirteen specimens in all; from 4.5–5.5 mm. long.

Omalus sinuosus.

Hedychrum sinuosum Say, Macl. Lyc. i, 82, 1828.

Elampus sinuosum Norton, Trans. Am. Ent. Soc. vii, 234.

Hedychrum janus Hald., Proc. Acad. Nat. Sci. Phila. ii, 55, 1844.

Elampus purpurascens Provancher, Nat. Can. xii, 303, 1881.

Five specimens from Illinois (Mr. Norton's determinations), eight from Colorado and one each from Montana and California; also five specimens in Provancher's collection from Canada, one of which is the type of *purpurascens.* The specimens from Illinois, with two from Canada, have the thorax bronzed and violet, with an absence of green or blue to a more or less degree; the Western specimens and the other Canadian specimens are less bronzed and violet with green reflections, and green on all the punctured areas, but I find in this character a great tendency to vary; some specimens from Colorado, and that from California, having the punctured areas mostly blue, while in two Illinois specimens they are slightly green or blue. Several Western and Canadian specimens are dull dark blue with green reflections, having but a slight tinge of violet on the abdomen, and in others with all violet reflections wanting entirely. The size of the Illinois specimens is from 3–5 mm., the Canadian 4 mm., the Western specimens from 3–6 mm. long.

Omalus corruscans.

Elampus corruscans Norton, Trans. Am. Ent. Soc. vii, 234, 1879.

Nine specimens in the collection from Canada (Norton's type), New Hampshire and one from New Mexico (Norton gives Connecticut also).

The Eastern specimens are all perfectly identical, 6.5 mm. long, while the specimen from New Mexico is 4 mm. long, the thorax with more green than the others, but with the abdomen similarly colored. Otherwise, and in the notch, it is the same. *Elampus corruscans* of Provancher belongs to *Notozus*.

Omalus semicircularis n. sp.—Green and blue with purple reflections; head and thorax pilose, the smoothed areas not very well defined, with scattered punctures. Second joint of antennæ a little green; abdomen strongly pilose on the sides and all over the third segment; margins of third segment bisinuate, and on each side of the large semi-circular notch a little produced; median lobe of mesothorax strongly punctured posteriorly; 5 teeth in the tarsal claw; 5.5 mm. long. ♂.

Colorado, one specimen; very distinct.

ELAMPUS Spinola.

Brullé Nat. Hist. des Ins. Hym. iv, 53, 1846.

Occiput with the punctures sparse, leaving some smooth areas; prothorax smooth, the anterior margin punctured more numerous laterally, the posterior margin with one row of punctures and several larger punctures in the middle placed irregularly; mesothorax polished, the sutures with each an irregular row of punctures lengthwise and the sides above the tegulæ with a single regular row; mesothorax evenly punctured, the postscutellum as viewed laterally even, or nearly even, not forming a horizontal blade as in most species of *Notozus*. Species, however, may be found that possess this character to a marked degree, as it shows itself to be variable in both genera.

Dorsum of postscutellum as viewed laterally even, not projecting posteriorly.
Entire lateral margins of third abdominal segments arcuated, or with a single broad shallow sinus; the snout-like prolongation of apex very slight, abrupt ..... **Cressoni.**
Lateral margins of third abdominal segment with two arcuations, or bisinuate, the prolongation strong, tapering ..... **variatus.**
Dorsum of postscutellum, as viewed laterally, projecting a little posteriorly. **speculum.**

Elampus Cressoni n. sp.—Head and thorax with the smoothed areas dark blue with slight purple reflections, punctured areas with green reflections; abdomen dark blue, purple and green, third segment short, abrupt; margins with a single arcuation or sinus, the snout-like projection slight, *i.e.* hardly extending from the ordinary line of the margins, but truncated; tarsal claws with two teeth; 3–3.5 and 4 mm. long. ♂. ♀

Montana and Colorado, three specimens.

Elampus variatus n. sp.—In the majority of my specimens the head and thorax have the smoothed areas dark green with blue and slight purple reflec-

tions; punctured areas green; abdomen dark blue with strong purple and green reflections. In other specimens the smoothed areas are dark blue with strong purple reflections, the punctured areas green, and the abdomen as above. In three specimens the smoothed areas are purple, in two of these the punctured areas purple and blue, the other specimen purple only, and the abdomen all purple with slight green reflections. Another specimen has dark, blackish blue, smoothed areas, punctured areas green, the abdomen black, with slight green reflections; third segment of abdomen tapering gradually towards its apex, the snout-like projection strong, the margins bisinuate, the apical one deepest, a ridge above the notch caused by its sides being suddenly bent downwards. The notch in most of the specimens is broad, the sides divaricate, in others it is drawn more closely together, appearing narrow and deep, with the sides almost or fully parallel; the claws with two, three and four teeth, the basal ones smallest; 4–4.5 mm. long. ♂. ♀.

Montana and Colorado; sixteen specimens. The divarication of the notch is most probably caused by the extension of the ovipositor, those having the divaricate notch being mostly females.

Elampus speculum.

Hedychrum speculum Say, Bost. Journ. i, 285, 1835.

Elampus speculum Norton, Trans. Am. Ent. Soc. vii, p. 234.

One specimen from Illinois (Mr. Norton's type); emerald-green, with some little purple and blue; wings infuscated; postscutellum conical, a little produced; margins of third segment bisinuate; 4 mm. long; three teeth in the claw. ♂.

DIPLORRHOS nov. gen.

The single species forming this genus agrees with the description of *Elampus*, with the exception of the following diagnostic character: just above the snout-like truncated projection of the apex of third segment *is a conical projection, forming the apex of a fold which extends on each side just above the apical and lateral margins.*

Diplorrhos plicatus n. sp.—Color in some specimens bright green, with bluish and brassy reflections, and little, if any, purple; darkest or nearly blue on the occiput; other specimens dark blue with deep purple reflections, greenish on the punctured areas, one specimen green, with dark blue reflections, and some purple on the abdomen, and two others dark blue with purple and green, the dorsum of abdomen shining black, the sides green and blue with a little purple; postscutellum as viewed laterally obtusely pointed and projecting a little posteriorly; the depth of the arcuations on margin of third abdominal segment varies in different specimens, as does also the distinct appearance of the submarginal fold; truncation of the apex as viewed laterally slightly rounded at the end, the notch very narrow, almost closed, the sides rounded, diverging; 2–3 teeth in the claw; 3.5–4.5 mm. long. ♂. ♀.

Montana, Colorado; nine specimens.

NOTOZUS Förster.

Verhand. der Naturhist. Vereins der preuss. Rheinlande x, 331, 1853.

Head and thorax all over about evenly punctured in most of the species, the occiput, pro- and mesothorax, more or less sparsely punctured; in some densely, in others, like *Elampus*, with smoothed areas. Abdomen closely and finely punctured; in some simply roughened by the punctures being shallow and confluent; margins of third segment bisinuate. The postscutellum in most of the species projecting into a well defined cone shaped piece or blade, which is flat above and rounded apically, but in other species this is only indicated by the postscutellum being obtusely mucronate, hardly projecting as seen laterally. The genus was originally founded on the prolongation of the postscutellum, and though this character is inconstant, it is generally correllated with the true diagnostic character, viz.: *apex of third segment with the snout-like projection filled up by a membrane that is triangularly excised beneath.*

Postscutellum somewhat obtusely pointed but not projecting posteriorly into a horizontal blade.....**intermedius.**

Postscutellum prolonged posteriorly into a raised, partly separate, horizontal blade or cone.

Pro- and mesothorax mostly smooth, the former punctured only on the anterior, lateral and posterior margins, and sparsely in the middle, and the latter with sparse punctures on the sutures; lateral margins of third segment with the apical half semi-transparent, brown. **seminudus.**

Pro- and mesothorax nearly evenly covered with punctures; lateral margins of third segment concolorous with the rest of the abdomen.

Abdomen bright golden and cupreous, with brassy and green reflections, thorax green and blue.....**nitidus.**

Abdomen like head and thorax, from dark blue with purple reflections to emerald-green with brassy reflections.

Wings clear hyaline, not infuscated.....**hyalinus.**

Wings infumated or infuscated.

The snout-like projection at abdominal apex with its closing membrane semi-transparent brown, and with a band of the same color before its apical margin.....**versicolor.**

The snout-like projection with its closing membrane black, concolored before its apical margin.

Abdomen, in shape, ordinary; about as long and wide as most of the species of this genus and its allies; the snout-like projection also median in size.

The snout-like projection of abdomen broad, short, not projecting very distinctly beyond the line of the margins of third segment. **viridicyaneus.**

The snout-like projection is longer and narrower, projecting distinctly beyond the margins of third segment.....**marginatus.**

Abdomen longer and narrower, the snout-like projection larger in relation to the third segment than in other species....**productus.**

Notozus intermedius n. sp.—Green, blue and fuscous on the dorsum of postscutellum; occiput very sparsely punctured, leaving smooth areas; prothorax with the anterior, lateral and posterior margins closely and broadly punctured, with some scattered punctures in the middle, leaving a narrow, smooth area across the middle on each side; mesothorax smooth, a double row of close punctures along the sutures, and few over the tegulæ; metathorax with large, rather divided punctures; the postscutellum not produced, but high and obtusely pointed posteriorly; abdomen with the first and second segments finely and sparsely punctured, larger and somewhat confluent on the third segments; margins of third segment broadly semi-transparent brown on apical half, apical prolongation slender, high, the truncation, as viewed posteriorly, elliptical; the closing membrane black; wings infuscated; 4 teeth in the claws; 4 mm. long. ♂.

Montana; one specimen; very distinct, but in some of the general characters intermediate between *Elampus* and *Notozus*.

Notozus seminudus n. sp.—Blue, with green and purple reflections, rather dull; occiput smooth, with a few small punctures in groups or rows; prothorax smooth on the disc, a few scattered punctures in the middle, the anterior and lateral margins closely punctured, the posterior margin with a single even row of punctures; mesothorax smooth, a few scattered punctures on the median sutures and above the tegulæ; metathorax evenly and strongly punctured, dull blackish or fuscous, with very little or no metallic reflections; abdomen with the first segment partly smooth, the second very finely and sparsely punctured, the third with the punctures much larger, confluent, appearing roughened; apical projection small, almost coming to a point, the truncation circular, the closing membrane black or fuscous; wings infuscated; 3–4 teeth in the claw; 5–6 mm. long. ♂. ♀.

Washington Territory; four specimens.

Notozus nitidus n. sp.—Head and thorax green, purple and blue, dull on the postscutellum, occiput, pro- and mesothorax sparsely, but almost evenly punctured; abdomen sparsely and finely punctured, elegantly colored with golden cupreous and some green reflections; venter green; femora and tibia green and blue, apical closing membrane black; wings infuscated; 3.5–4 mm. long. ♂.

Montana and California; two specimens; a most beautiful and very distinct species.

Notozus hyalinus n. sp.—Entirely green, blue and purple, dull on the postscutellum; occiput pro- and mesothorax sparsely but evenly punctured; abdomen sparsely and very finely punctured; apical projection evenly rounded above, the end circular; membrane black; wings clear hyaline; 4–4.5 mm. long. ♀.

Montana and Nevada; three specimens.

Notozus versicolor.

Elampus versicolor Norton, Trans. Am. Ent. Soc. vii, 235, 1879.

One specimen from Dakota (the type) and one from Montana. The first is dark blue and purple with green reflections, while the Montana specimen is emerald-green with very little blue and no purple. The

punctures on the abdomen less confluent and more distinct, and the roughened surface less marked than the Dakota specimen. The Montana specimen with the apical projection a little less pronounced than the type; 5–5.5 mm. long.

Notozus viridicyaneus.

Elampus viridicyaneus Norton, Trans. Am. Ent. Soc. vii, 235, 1879.
Elampus coruscans (Norton) Provancher, Nat. Can. xii, p. 303.
Elampus spinosus Provancher, ibid, p. 302, 1881.

Four specimens from the localities: Massachusetts (type), Colorado and Montana, and two specimens in the collection of M. Provancher from Canada, the type of *spinosus*, and the specimen determined as *Omalus coruscans* Norton. The color is green, purple and blue, about equally distributed, except in the Colorado specimen, which has less green and more blue. Punctures on occiput pro- and mesothorax rather sparse and subeven, but in one Montana specimen the punctures are close and regular. The apical projection of the third segment is short, large, semicircular, the closing membrane black. *Spinosus*, of Provancher, does not differ, it is not so large as the specimen from Colorado, the continuation of the metallic color upon the tarsi and antennæ is a variable character and of no importance, and the spine beneath and at the apex of the tibia is present in all the species; 3 and 4 teeth within the claw; 5.5–6 mm. long.

Notozus marginatus Patton, Can. Ent. xi, p. 66, 1879.
Elampus viridis (Cresson) Provancher, Nat. Can. xii, p. 303.

Twenty specimens in the collection from the following localities:—Canada, New Hampshire, Montana, Washington Territory, British Columbia, Colorado and California; also three specimens in Provancher's collection determined as *viridis* Cresson. Specimens vary wonderfully in color from emerald-green with golden reflections and bright blue with purple reflections to deep dull black with very little purple; apical closing membrane black; 3.5–5 mm. long.

Notozus productus n. sp.—Long and slender; bright emerald-green with blue and some purple reflections, duller on the postscutellum; occiput pro- and mesothorax rather sparsely but somewhat evenly punctured; abdominal punctures very close or confluent, so as to cause the surface to appear roughened; abdomen lengthened, longer than in the other species, the third segment evenly tapering, comparatively less so than in other species; apical projection large, even, semi-circular, the closing membrane deep brown or fuscous; wings subhyaline, fumate on the apical half, 3 teeth in the tarsal claw; 5–5.5 mm. long. ♀.

Montana; five specimens.

HOLOPYGA Dahlbom.

Hym. Eur. ii, 47, pl. iii, 1854.

Evenly and closely punctured all over, largest on metathorax, smallest on the occiput and the abdomen; 2–4 distinct teeth between the base and apex of tarsal claw.

This genus is allied to *Hedychrum* and *Hedychridium* in the distribution of the punctures and the character given by the general appearance, but it is equally allied to *Omalus*, *Elampus* and *Notozus* in the toothed tarsal claws and its tendency to vary in the number of these teeth. By its intermediate characters it seemingly prevents the separation of these two groups of genera into sub-families.

Three or four teeth within the tarsal claw, the intervals between the abdominal punctures smooth ..... **ventralis.**

Two teeth within the tarsal claw, the interval between the abdominal punctures with fine shallow punctures ..... **horus.**

Holopyga ventralis.

Hedychrum ventrale Say, Long's second expedition, App. 330, 1824.
Holopyga compacta Cresson, Proc. Ent. Soc. Phila., iv, 304.
Hedychrum violaceum Provancher, Nat. Can. xii, 301.
Holopyga ventralis Norton, Trans. Am. Ent. Soc. vii, 235.

Before me are seventy-six specimens, all with 3 or 4 teeth in the claw, among which are several specimens determined by Mr. Norton as this species, and the type specimen of Mr. Cresson's *H. compacta;* the others are from Georgia, Illinois, Montana, Washington Territory, Colorado, California, Texas and Vancouver's Island. Among these are several well marked varieties, but the characters separating them are in no case constant, and the connecting links are numerous and gradational. These characters are as follows: bright emerald-green all over with brassy reflections, without blue or purple, to dark blue and purple with slight green reflections, and all intermediate shades; lateral margins of third abdominal segment with two slight arcuations, in others the lobe is wanting and the margins with one long arcuation (also gradational); apex of third segment with a broad shallow notch, in others wanting, the apex rounded, and in most of the specimens the notch is slight and gradational. In some few specimens the entire margin of third segment is straight and even. There is also a gradation between the third and fourth toothed claws; 4.5–7 mm. long.

Holopyga horus n. sp.—Dark green with some blue and purple, or light blue with much green and a little purple; a slight arcuation at apex of third segment; one specimen has the lateral margin slightly angulated, the others with the margin with one long arcuation, not angulated; 4.5 mm. long. ♂. ♀.

Montana and Nevada; four specimens.

HEDYCHRIDIUM Abeille de Perrin.

Ann. Soc. Linn. de Lyon, 26, p. 35, 1879.

Between *Holopyga* and *Hedychrum* on account of the punctured area below postscutellum and the somewhat intermediate character of the teeth of the tarsal claws, viz.: one small tooth in the middle of claw; punctures, appearance, etc., much as in these two allied genera.

A triangular punctured area below the postscutellum ending in a short median ridge, foveolæ on each side diagonal.

Pro- and mesothorax with close punctures, all of about equal and medium size; postscutellum continuing into the area and not divided from it except by a slight projection. As viewed laterally the apex of the second segment is raised considerably above the base of the third segment...**dimidiatum.**

Pro- and mesothorax with close fine punctures interspersed with sparse, large, shallow punctures; postscutellum somewhat divided by its margin from the area. As viewed laterally the apex of the second segment is nearly even with the base of the third.....**viride.**

Postscutellum connected directly with a median ridge on the metanotum; foveolæ on each side transverse, striated.....**cæruleum.**

Hedychridium dimidiatum.

Hedychrum dimidiatum Say, Long's second expedition ii, 331, 1824; Norton, Trans. Am. Ent. Soc. vii, 237.

Thirteen specimens from Delaware, Illinois, Virginia, Colorado, So. California, Montana and Washington Territory. The five Eastern specimens all have a decided bluish shade, with as much green and some purple reflections. The Western specimens have a decided green color with less blue and some purple; dorsum of abdomen in some specimens dull blackish, purple, the same shade of color as across the extreme base of the segments beneath the overlaping of the preceding segments. One specimen is entirely emerald-green with brassy reflections, no blue, and a touch of golden on the scutellum. On the metanotum, below and contiguous to the postscutellum, a small, triangular, punctured area, pointed below and continuing into a median ridge above the extreme base of the abdomen. On each side of this triangular, punctured area are long, shallow, diagonal foveolæ, roughened, or with substriæ, and generally of a darker color.

Hedychridium viride.

Hedychrum viride Cresson, Proc. Ent. Soc. Phila., iv, 306, 1865; Norton, Trans. Am. Ent. Soc. vii, 238.

Thirty-nine specimens from Colorado (the types), Montana, Dakota, Washington Territory, California and Utah. The color is generally emerald-green with brassy reflections; in some specimens the abdomen is darker with blue reflections, in others the blue is predominating with

purple and green reflections; very closely allied to *dimidiatum;* differs in having the margin of the postscutellum dividing it from the following punctured area on the metanotum, in the punctures, and in the base of the third segment being nearly even with the apex of the second. In some specimens the third segment is subconical, but this character, together with the striated basin of face and the density of the abdominal punctures is inconstant, and in some specimens one or more of these characters approach *dimidiatum.*

Hedychridium cæruleum.

Hedychrum cæruleum Norton, Trans. Am. Ent. Soc. vii, 239, 1879.

Two specimens from Dakota and Montana. The type is dark blue with green and blue on the thorax, mostly purple on the abdomen, the other is lighter blue with much green and little purple. On the metanotum, below and connected with the postscutellum, a median ridge, on each side of which is a branching transverse ridge directed towards the metasternal spines. Between the transverse ridges and the posterior margin of the postscutellum are longitudinal striæ, longer laterally, and below these, on each side of the median ridge, a triangular, slightly roughened space.

HEDYCHRUM Latreille.

Hist. Nat. Cr. et. Ins. 1804.

Occiput pro- and mesothorax with smoothed areas and sparse punctures. **obsoletum.**

No smoothed areas, strongly and closely punctured all over the head and thorax.

Dorsum of thorax coppery red (or golden and green with red reflections in some specimens), contrasting with the head, metanotum, legs and abdomen, which are green or blue..... **cupricolle.**

Dorsum of thorax about uniform in color, from blue and purple to emerald-green, not contrasting with the other parts, and if inclining to coppery or golden, the other parts have bright brassy or golden reflections.

As viewed posteriorly the postscutellum is rounded and connects with a median ridge on the metanotum; the metanotal spines have the excavation at the base anterior to the black foveolæ with cross striæ (a great variation in size, color and other minor characters, is represented in this species. See description)..... **violaceum.**

As viewed posteriorly the postscutellum is followed by or extended into a punctured area on the metanotum, which takes the place of the median ridge; the metanotal spines have foveolæ or punctures at the base anterior to the black foveolæ; not striated..... **continuum.**

Hedychrum obsoletum Say, Boston Journal i, 284, 1835; Norton, Trans. Am. Ent. Soc. vii, 237.

H. Zimmermanni Dahlb., Hym. Eur. ii, 61, 1882.

Four specimens from Illinois and Pennsylvania (Iowa, Say). Front closely and vertex loosely punctured, green; occiput pro- and mesothorax polished with small, very sparse punctures, purple and blue; sides and

metathorax green, with large, shallow, close punctures; postscutellum followed by or extended into a small punctured area on the metanotum, which in turn ends in a median ridge; foveolæ at sides triangular and with the extreme base of spines transversely striated; abdomen polished, very finely and sparsely punctured, deep blue and violaceous purple, with slight crimson reflections in certain lights. A very distinct species on account of the lack of punctures on certain portions; 5.5 mm. long.

Hedychrum cupricolle Cresson, Proc. Ent. Soc. Phila. iv, 305, 1865.

Three specimens from Colorado (two of which are Mr. Cresson's types). Densely and rather finely punctured on the head and thorax, excepting the scutellum and postscutellum, which have the punctures larger; abdomen with the punctures a little separated, but on some portions becoming contiguous. In the types the head, sides, legs, metanotum and abdomen are emerald-green with a little blue, the entire dorsum of thorax bright coppery red, the postscutellum a little green; 7.5 mm. long. In the other specimen the median lobe of mesothorax alone coppery red, the other portions of dorsum of thorax bright golden and emerald-green with coppery reflections; front green, sides green and blue, metanotum purple and blue; occiput, legs and abdomen blue, purple and green; 6 mm. long.

Hedychrum violaceum.

Form VIOLACEUM.

Hedychrum violaceum Brullé, Hist. Nat. des Ins. Hym. iv, 51; Norton, Trans. Am. Ent. Soc. vii, 238.

Hedychrum asperum Brullé, loc. cit. p. 52; Norton, loc. cit.

Form WILTII.

Hedychrum Wiltii Cresson, Proc. Ent. Soc. Phila. iv, 305; Norton, loc. cit. p. 237.

Hedychrum Louisianæ Norton, loc. cit.

Form PARVUM; new.

I have before me seventy-eight examples of this species, among which are Mr. Cresson's type of *Wiltii*, Mr. Norton's type of *Louisianæ*, and his determinations of *violaceum* and *asperum*, which are undoubtedly correct. The variation in size of the races of this species is most remarkable, and relatively to the named forms is as follows: *Wiltii*, 13.5–10.5 mm. Kansas, Nebraska, Colorado; *Louisianæ*, 10.5–8 mm. Louisiana, Georgia, Texas, Colorado, Washington Territory; *Violaceum*, 8–7 mm. Virginia, Montana, Washington Territory, Mexico; *Asperum*, 7–5 mm. Canada, Maine, New Hampshire, Pennsylvania, New Jersey, Delaware, Virginia, Georgia, Montana, Dakota, Washington Territory, Colorado, California, Vancouver's Island, Mexico; *Parvum*, 5–4 mm. long, from Montana.

It will be seen from the above that the localities have nothing to do with the establishment of varieties, and even the forms here given, founded only on relative size, are of little or no value, simply because the gradation throughout is equal and absolutely intact. *Violaceum* (= asperum) is the medium and representative form. Other slight variations are noticeable, which take place entirely irrespective of size or locality, these are the posterior margin of postscutellum being uneven, or rather broken, larger or smaller abdominal punctures, a polished space down the middle of first and second segments, sinuated or angulated margin of third segment, etc. The color also varies in all the forms from emerald-green with brassy reflections to deep blue and purple and very little green. The North-eastern specimens are all dark blue with purple and green, with one exception from Canada (Provancher's collection), which is dark green with a little blue. In the Southern and Western specimens those with dark green and little blue predominate with the blue specimens from every locality. The student will at first readily separate *Wiltii* from the other forms in his collection, and he will not be able to comprehend its proper relation to them without a large series to show the inconstancy of characters, it appears so remarkably different. There was, seemingly, good reason for Mr. Cresson to describe *Wiltii* as distinct from *violaceum*, its then only described ally, as it is twice the size apparently. On the other hand there is no difference between the type of *Wiltii* and the type of *Louisianiæ*, except the latter being 3 mm. shorter and of a dark green and blue instead of blue and purple and green. The character in Mr. Norton's key as separating these two as species is not a correct one. *Wiltii* should come under the same heading as *Louisianiæ*, viz.: "postscutellum connecting abruptly with the short dividing ridge of the metathorax."

Provancher's *violaceum* is *Holopyga ventralis* Say.

Hedychrum continuum n. sp.—One specimen emerald-green with brassy reflections and no blue, one specimen with the thorax green and blue, the abdomen blue and purple, three specimens darker green with brassy reflections and more or less blue, and another almost entirely dull purple, a little blue on the abdomen, closely punctured on the thorax; abdomen with the larger punctures rather separated, with smaller punctures between, appearing roughened in some specimens; posterior portion of the metanotum below the postscutellum evenly and finely punctured, no median dividing ridge, the postscutellum slightly overhangs the metanotum. In the emerald-green specimen the narrow, smoothed margin of the postscutellum continues around its apex, dividing it from the punctured metanotum; lateral margins of the third abdominal segment straight; apex with a broad, shallow sinus in some specimens; 3-4 mm. long. ♂ ♀.

Nevada, California, Washington Territory; six specimens.

Sub-family—CHRYSIDINÆ.

Head as broad, or broader than the postscutellum; space between the eyes on the face as wide as the distance between the base of antennæ and the vertex; the carina transverse, not forming a basin on the vertex; postscutellum rounded posteriorly; first abdominal segment rounded, not carinated on the sides; second segment about twice as long on the dorsum as on the sides, its posterior margin about straight in the middle, convex laterally.....**Chrysis.**

Head small, much narrower than the postscutellum; space between the eyes, on the face, narrow, not half as wide as the distance between the base of antennæ and the vertex; the carina extended upward, surrounding the anterior ocellus, forming the margins of a distinct basin, much in shape of a horseshoe; postscutellum partly hidden, projecting into a subconical piece, which is strongly excavated; first abdominal segment flattened on the sides, causing a short, oblique carina above; second segment more than three times as long on the dorsum as on the sides, its posterior margin greatly convex equally.....**Stilbum.**

CHRYSIS Linné.

Syst. Nat. ed. xii, vol. i, p. 947, 1767.

In this genus the differences in the form of the apical margin of the third abdominal segment seems to be only of *subgeneric* importance as subordinate to the generic distinction. *Five* and *seven* dentate forms are represented by certain exotic species. *Chrysis amœna* Eversm., belonging to the former, is described and figured by Radaskovsky in Horæ Soc. Ent. Ross. iii, 295, and Frederic Smith has described species with five and seven teeth in Trans. Ent. Soc. London, 1874, 460–462. I have examined specimens from Africa of the allied genus *Pyria*, of which so far we have no representative in North America.

Our subgenera are thus characterized:—

Apical margin of abdomen entire.....**A.**
" " notched.....**B.**
" " unidentate (unilobed).....**C.**
" " tridentate.....**D.**
" " bidentate.....**E.**
" " quadridentate.....**F.**
" " sexdentate.....**G.**

A.—Apical margin of abdomen *entire*.

Abdomen dark red, with green, purple and golden reflections.....**martia.**
Abdomen colored as the thorax, green, or blue and purple.
Posterior corners of the margin of third segment rounded, even, not produced.
An arched carina across the front of the head immediately above the basin of face, which is striated.....**verticalis.**
Front without carina, basin of face punctured.
Posterior lateral angles of the metathorax subobtuse, not produced.

Margin of third segment evenly rounded.....**inusitata.**
Margins of third segment straight laterally and on the apex, broadly rounded on the angles, much tapered.....**optima.**
Posterior lateral angles of the metathorax more or less produced or pointed.
Anteapical series of pits contained at the bottom of a strong declivity ending on each side near the base of the segment.....**pacifica.**
Anteapical series of pits contained in a broad, shallow groove or sulcus, becoming obsolete laterally and ending not half way to the base of segment.
Apical margin of third segment straight, or slightly rounded outwardly.
hilaris.
Apical margin of third segment slightly sinuate in the middle.
integra.
Posterior corners of the margins of third segment angulated, produced.
Corners produced but slightly into a rounded lobe, series of pits small, ending about in the middle of the lateral margins.....**cobaltina.**
Corners produced into a well defined triangular tooth bluntly pointed, the series of pits large, ending near the base of the segment.
lateri-dentata.

Chrysis martia Patton, Can. Ent. xi, 67, 1879.

"Head and thorax green; abdomen dark red with green and purple reflections; head and thorax densely and strongly punctured, no transverse ridge between the eyes; prothorax with a median groove; postscutellum and metathorax evenly rounded above; abdomen densely punctured, the punctures finer than those of the thorax; the series of foveolæ on the third segment consisting of twelve deep punctures, the median ones the largest; second and third segments of equal length, the third segment narrowed a little beyond the foveolæ and produced in the centre, the tip truncate, of more than one-third the width of the segment, not dentate; wings hyaline; 5 mm. long. Godbout River, Lower Canada."

From the description of Patton; the insect is unknown to me. Without being able to examine the peculiar character of the apical margin as described, it becomes rather puzzling. I have placed the species in the group with the margin entire, but very doubtfully, however, as it may belong to the *unilobed* group. I have also placed it before *verticalis*, not intending, however, to indicate its correct position.

Chrysis verticalis Patton, Can. Ent. xi, 67, April, 1879.
Chrysis striatellus Norton, Trans. Am. Ent. Soc. vii, 239, May, 1879.

Fifteen specimens in the collection from the following localities: Massachusetts, Delaware, Virginia, Illinois (types of *striatellus*), New Hampshire, Georgia, Colorado, Washington Territory and California. Norton also mentions Pennsylvania. Varies from bright green with blue reflections to dull blue and purple. The dorsum of the abdomen in many specimens is dull, with the reflections darker than the general color. In some specimens the dorsum is dull black with very slight reflections. The head is much longer than is generally the case in the species of the genus; 4–6 mm. long.

Chrysis inusitata n. sp.—Bright emerald-green with brassy and slight golden reflections. Very densely punctured all over, the punctures on the head and thorax of two sizes, the larger ones sparse, the finer punctures entirely filling up the intermediate spaces, largest on dorsum of metathorax, very fine on the metanotum; face punctured, obliquely and very slightly striated just above the base of antennæ; abdomen with the punctures dense, equal, fine on the dorsum; wings hyaline, subfuscous on the radial cellule; postlateral spines of the metanotum abbreviated, subobtuse, not produced; apical margin of the third abdominal segment evenly rounded; pits small, contained in a shallow groove; 8.5 mm. long. (♀ ?)

Vancouver's Island, California; two specimens.

Chrysis optima n. sp.—Bright green and blue, one specimen emerald-green; densely punctured, the punctures on the head and thorax of two sizes, the larger ones separated, the smaller closely filling up the spaces between, largest on the scutellum and postscutellum, fine on the metanotum; the posterior lateral angles of the metanotum, abbreviated, obtuse; face punctured with very fine, oblique striæ just above the base of antennæ; abdomen densely and about equally punctured; third segment with margins rounded unequally, narrowed at the apex, the ovipositor projecting and showing a metallic green color; the pits rather separated, contained in a broad shallow groove; wings hyaline, slightly infuscated on the disc; 8 mm. ♀.

California; three specimens.

Chrysis pacifica Say, Macl. Lyc. i, 82, 1828; Norton, Trans. Am. Ent. Soc. vii, 240.

Seventeen specimens in the collection with the following localities represented: New York, Delaware (Norton's types), North Carolina, Texas, Colorado, Washington Territory, California and Labrador. This is undoubtedly Say's species. One specimen emerald-green with brassy and some golden reflections, the others are green and blue, with slight variation as to depth of color. Some specimens with a slightly smoothed space down the middle of the face; densely punctured, large and equal on the head and thorax, of two sizes on the abdomen, the larger ones separated, the finer punctures rather close; pits rather large, oblong, contained in a strong groove; varies greatly from 6–12 mm. in length. Both males and females.

Chrysis hilaris Dahlbom, Hym. Eur. ii, p. 103, 1854; Norton, Trans. Am. Ent. Soc. vii, 239.

Chrysis halictula Gribodo, Ann. Mus. Senov. vi, p. 359, 1875.

Four specimens from the localities: Canada, Illinois, Washington Territory and California (Connecticut, Norton). Varies from emerald-green to blue, purple and green; basin of face punctured; head and thorax densely punctured, large and equal, a little separated on the prothorax, with a few fine punctures between; finer and subequal on the abdomen (of two sizes according to Norton's description); apex of the

second segment almost smooth; 5.5–8 mm. long. Gribodo's *halictula* does not differ; his description is as follows (the notes in brackets are mine): "Related to *C. hilaris* Dahlb., but distinguished from it in the following characters: antennæ filiform, articles not swelling (varies in *hilaris*), posterior margin of pronotum and sides not abnormal (not abnormal in *hilaris*), third segment of abdomen conspicuously narrower at apex than at base (also decidedly the case in *hilaris*), anteapical series moderately abrupt (small, but distinct in *hilaris*, this is probably what is meant by abrupt), length of body 6 mm. Habitat, California."

Gribodo has incorrectly determined *hilaris*, for Dahlbom's description reads: "metanoti anguli postico-laterales magni conici."

Chrysis tota Aaron.

Chrysis integra (name preoccupied) Cresson, Proc. Ent. Soc. Phila. iv, 306, 1865; Norton, Trans. Am. Ent. Soc. vii, 240.

Six specimens in the collection, including the type, all from Colorado; color is emerald-green all over with brassy reflections and very little blue; head and thorax covered with comparatively long fuscous pubescence; head, thorax and lateral surface of abdomen with the larger punctures sparse, the intermediate spaces filled up with close, fine punctures; 10–12 mm. long. The var. a. ♀ of Norton is the following species. The name *integra* has been used by Fabricius (Syst. Ent. ii, 241) for a species found in Africa.

Chrysis cobaltina n. sp.

Chrysis integra var. a. ♀. Norton, Trans. Am. Ent. Soc. vii, 240.

Elegant blue with some green and very slight purple reflections; head with dense fuscous pubescence, shorter and less dense on the thorax; head and thorax densely punctured, on the prothorax with some finer punctures between the larger ones; punctures on abdomen less dense, those on the first and second segments shallow, the larger ones sparse, and with separated finer punctures on the intermediate spaces, those on the third segment contiguous, subequal; apical margin of third segment very slightly sinuate in the middle, the lateral posterior corners distinctly but slightly produced or lobed; pits small, shallow, rather close, contained in a shallow groove, which ends about midway on the lateral margin; wings hyaline, the basal half infuscated, the radial cell darkest; tarsi fuscous; 9 mm. long. ♀.

Massachusetts; one specimen. This is probably the typical specimen of Norton's var. a. ♀ of *integra*.

Chrysis lateri-dentata n. sp.—Rather dull, light green, with some brassy reflections; head and thorax closely punctured, the punctures not large, subequal; abdomen with the first and second segments densely punctured, the larger ones separated, the spaces between them filled up with finer punctures of several sizes; third segment with the punctures smaller, contiguous, subequal; apical margin nearly straight, the lateral posterior corners each produced into a

distinct pointed tooth; pits medium, contained in a deep groove, which ends on the lateral margin near the base of the segment; wings hyaline, basal half infuscated; tarsi light brown; 9 mm. long.

Montana and Washington Territory; three specimens, all ♀.

Differs from *cobaltina* in having little or no pubescence on the head and thorax, in the pits and grooves, in the lateral apical teeth and by the larger punctures on abdomen being deeper.

B.—Apical margin of abdomen *notched.*

Basin of face cross striated, lateral margins of third segment bisinuate, or nearly straight.
Abdomen blue or green, colored as the thorax or head.....**perpulchra.**
Abdomen elegant metallic scarlet and gold (or cupreous), head and thorax blue and green.....**faceta.**
Basin of face finely punctured, lateral margins of third segment distinctly angulated, the angles a little produced.....**densa.**

Chrysis perpulchra Cresson, Proc. Ent. Soc. Phila. iv, 308, 1865; Norton, Trans. Am. Ent. Soc. vii, 241.

Twenty-seven specimens in the collection from the localities: Canada, Delaware, North Carolina, Georgia, Colorado (the type), Utah, Nevada, California, New Mexico, Montana, Washington Territory and Vancouver's Island. There are variations in color from deep blue and little green with some purple, to emerald-green with no blue or purple. Some specimens have the upward continuation of the carina strong, enclosing the anterior ocellus; others having this continuation almost wanting. The notch in the middle of the apical margin of third segment varies in size and depth, and the lateral margins are in some specimens straight, in others slightly sinuate; length from 6–8 mm.

Chrysis faceta n. sp.—Head and thorax blue with green reflections, closely covered with equal punctures; basin of face striated, on each side covered with white pubescence; carina extending upwards and almost surrounding the anterior ocellus. On each side of the occiput above and behind and touching the eye, a rounded, strongly convex, smooth space, blue, and two others similar, but smaller, and each with a brassy and green reflection, just behind and touching the posterior ocelli; abdomen golden and cupreous, with elegant ruby reflections, in great contrast to the thorax, a faint green reflection at the base of the first segment and the apical margin beyond the pits, green; sutures black, shining, when exposed; the punctures are as large as those of the thorax, but less dense, except on the immediate dorsum; apical margin of third segment deeply notched in the middle, on each side of the notch the margin is pointed; lateral margins very broadly but slightly sinuate or arched inwardly; pits medium, close, contained in a strong groove, which runs parallel to the lateral margins and ends near the base of the segment; wings hyaline, very slightly infuscated on a part of the radial cellule; tarsi fuscous; 4.5 mm. long. ♀ (?).

Colorado; one specimen. The character of the convex lobes on the occiput is very odd, and does not appear in any other species of the family with which I am acquainted.

Chrysis densa Cresson, Proc. Ent. Soc. Phila. iv, 307, 1865; Norton, Trans. Am. Ent. Soc. vii, 241.

Eleven specimens from Colorado and California, including Mr. Cresson's type specimens. The color varies from light blue with much green and slight purple reflections to emerald-green with very little blue and no purple; wings almost clear hyaline in one specimen, in the others subflavescent to a more or less degree; very densely and almost equally punctured all over. There is a great variation in the margins of the third abdominal segment, in that the angle of the posterior and lateral margins is in some specimens over 160°, while in others it is less than 140°. In the latter the posterior margin is much less extended at the apex, and the segment appears quadrate, and the margin between the lateral angles and the notch is arched a little outwardly or straight, while in the former the apical margin is extended in the middle, and between the notch and angles is arched inwardly. The grades exist. This species approaches nearest the bidentate species, and through the development of the lateral angles into teeth, and the lobes on each side of the notch into extended points or teeth, probably represents the ancestral form of the bidentate and quadridentate species.

C.—Apical margin of the abdomen unidentate (*unilobed*).

Chrysis discreta n. sp.—Head and thorax emerald-green with slight blue reflections, evenly punctured, the punctures a little separated; basin of face cross striated, front carinated, the carina on each side continued upwardly and nearly surrounding the anterior ocellus; prothorax not so long as the head; postscutellum very slightly produced, as in the tridentate species; metanotal spines produced, a little curved, bluntly pointed; abdomen emerald-green with the basal two-thirds of the second segment, broadly on the dorsum, rich blue and purple; punctures equal, even, a little more separated than on the thorax; third segment much narrower at the apex, the lateral margins a little sinuate on each side of the central, slightly produced, rounded lobe; pits medium, close, contained in a strong groove, which ends on each side a little behind the junction of the apical and lateral margins, and which is divided in the middle by a very distinct ridge across the pits reaching the apical lobe; wings slightly infumated, tarsi fuscous; length 4.5 mm. long. ♀.

North Carolina; one specimen. This species belongs to the same group as the Old World species *Leachii* and *succinctula*, but is very distinct from them on account of the blue and green abdomen.

D.—Apical margin of abdomen *tridentate.*

Postscutellum rounded posteriorly, not produced.....**Doriae.**
Postscutellum conical, produced posteriorly.....**parvula.**

Chrysis Doriae Gribodo, Ann. Mus. Genov. vi, p. 359, 1875.—"Similar to *C. cyanea* L., as to character (?), but is readily distinguished by its entire anus; slender green-blue, somewhat shining; head and thorax somewhat thickly punctured; abdomen sparsely and moderately punctured: third segment distinctly narrower at the apex than at the base, curved, subtruncate; anteapical series moderately abrupt, distinctly interrupted in the middle, foveolæ obliterated. Length of body 4.5 mm. Habitat Boreal America."

Translated from Gribodo's description. The collection does not contain this species. The character given in the above table for *C. Doriae* is taken from Dahlbom's table as relates to *C. cyanea*, viz.: "Postscutellum muticum," and is assumed for this species because Gribodo's description reads "similar to *C. cyanea*," with no difference as to the postscutellum mentioned.

Chrysis parvula Fabr., Syst. Piez. 176, 1804; Dahlb., Hym. Eur. ii, 191, tab. x, 106; Norton, Trans. Am. Ent. Soc. vii, 242.
Chrysis carinata Say, Ann. Macl. Lyc. i, 82, 1828.
Chrysis tridens Lep. et Serv. Encycl. x, 495, Pyria; Brullé, Nat. Hist. des Ins. Hym. iv, 46, 1846.
Chrysis mucronata Brullé, loc. cit. 45, 1846; Norton, Trans. Am. Ent. Soc. vii, 242.
Chrysis 3-dentata Dahlb., Dispos. 15, 22, 1845.
Chrysis virens Cresson, Proc. Ent. Soc. Phila. iv, 309, 1865.

The forms of *parvula* and *mucronata* have no constant characters to separate them. The carina across the front is sometimes entirely without the upward branches, and there is every intermediate form between this and two strong branching carina on each side, one near the anterior ocellus. Other specimens have the inner carina strong, the outer hardly present. There is also no difference in the projection of the metathorax as mentioned by Brullé. There is a considerable variation in the relative size of the apical teeth, the outer ones in some specimens being only sharp angles of 100° and the median tooth short, while in others the outer teeth are well produced and the median one long and slender, sometimes a little bent down; also all forms between these extremes. The color is from dark blue with purple and some green reflections to emerald-green with no blue or purple. The anteapical series of pits differ in size and shape. Varies in size from 7–11 mm. United States and Mexico. In all fifty-three specimens, including the type of *virens* Cresson, which does not differ.

E.—Apical margin of abdomen *bidentate.*

Abdomen colored like thorax, emerald-green.....**scitula.**
Abdomen cupreous, scarlet and gold, thorax blue and green.....**aurichalcea.**

Chrysis scitula Cresson, Proc. Ent. Soc. Phila. iv, 309, 1865; Norton, Trans. Am. Ent. Soc. vii, 242.

One specimen (the type) from Colorado. It is emerald-green with some brassy reflections; punctures about equal all over, dense on the head and prothorax, less dense on the metathorax; a little separated on the first and second segments of the abdomen, very dense and indistinct on the third segment. The apex of the third segment contains two distinct teeth, separated by a rounded emargination, and on each side of these teeth is a broader sinuation separating the distinct lateral angles from the apical teeth. This is, though less fully developed, the exact pattern of the normal 4-dentate species; pits small, rounded, rather close, contained in a shallow groove; deeper laterally; 6 mm. long. The specimen is a ♀.

Chrysis aurichalcea Prov. Nat. Can. xii, 300, 1881.

Before me are three specimens, one of which is Provancher's type from Canada, the others from Maine and Canada; the head and thorax in the two Canadian specimens blue with much green and purple, the Maine specimen with the predominating color green, with some blue and purple reflections. In all densely punctured, finest on the head; basin of face broadly smooth; abdomen in the Canadian specimens cupreous and golden, with brilliant emerald-green reflections in certain lights; in the Maine specimen cupreous with deep scarlet or ruby reflections, almost entirely ruby on the dorsum, with green reflections only at the base of first segment and on the apical margin beyond the pits; abdominal punctures on first and second segments equal, close, very little separated, becoming irregular laterally, and confluent and irregular on the third segment; pits medium, rounded, subequidistant, contained in a shallow groove ending midway on the lateral margin; lateral angles and apical teeth as in *scitula;* 7–7.5 mm. long. All females.

F.—Apical margin of abdomen *quadridentate.*

Prothorax much *shorter* than the head (plate x, fig. 88).
As seen from the side the lateral margins of third segment are bisinuate, slightly near the middle and distinctly just before the outer teeth.
Emerald-green, golden and cupreous.....**Meta.**
From dark blue and purple to emerald-green, with nothing more than brassy reflections.

Basin of face smooth (more largely just below the cross carina), anterior margin of the groove containing the pits of third segment straight; pits normal rounded.

Median teeth short, stout and rounded..... **dorsalis.**

Median teeth long, slender and pointed..... **montana.**

Basin of face striate, anterior margin of the groove containing the pits of third segment arched inwardly by the increased size of the median pits..... **Frey-Gessneri.**

Basin of face finely punctured.

Each side of the face covered with long white hairs; as seen from the side the outer apical teeth are long and slender and decidedly turned down..... **hirsuta.**

No long white hairs covering the face; the outer apical teeth as seen from the side are abrupt, triangular and projecting in a line with the lateral margin.

Median teeth closer together than the median and outer teeth; outer teeth, hardly projecting, about six or eight distinct large semi-transparent luteous pits, forming a deep broad groove..... **pelucidula.**

Median teeth farther apart than the median and outer teeth; outer teeth rather strong, about ten or twelve indistinct medium pits, not apparently semi-transparent..... **Pattoni.**

As seen from the side the lateral margins of third segment are straight, or slightly arched inwardly.

Basin of face striate..... **venusta.**

Basin of face punctured.

Median teeth separated by a shallow, evenly curved arcuation, farther apart than the median and outer teeth..... **nitidula.**

Teeth, and the emarginations between them, subequal, or with the median teeth separated by a deeper rounded emargination and nearer together than the median and outer teeth..... **cœrulans.**

As seen from the side the lateral margins of the third segment are sinuate, or arcuate, just before the outer apical teeth.

Anterior margin of the groove containing the pits abrupt, forming a distinct swelling or declivity, and as seen from above the apical portion of segment with its lateral margins nearly parallel, very far within the overhanging margins of the groove..... **inflata.**

Anterior margin of the groove rising only slightly above the pits, and as seen from above the apical portion of segment with its lateral margins connivent, nearly equal with the lateral margins of the basal portion. **Nortoni.**

As seen from the side the lateral margins of the third segment are arched outwardly, nearly straight just before the outer apical tooth. **peracuta.**

Prothorax as long, or longer than the head (plate x, fig. 89).

Lateral margins of the third segment straight..... **tripartita.**

Lateral margins of third segment bisinuate.

Teeth tolerably long and slender, pointed, the median much longer than the outer..... **propria.**

Teeth short, rounded at the apices, subequal..... **lauta.**

Chrysis Meta n. sp.—Varies from emerald-green with brassy reflections, and slight golden reflections on the abdomen to golden and green with strong cupreous reflections, deepest on the abdomen; head and thorax closely and equally punctured, finest on the head; basin of face broadly smooth; abdomen with the punctures of the first and second segments somewhat separated but evenly distributed, with finer punctures scattered among the others; specimens with the abdomen deep cupreous have the sutures, when exposed, black, and a patch on basal half of dorsum of second segment black, shading to green, the punctures within it green; third segment with the punctures larger, a little confluent; apical margin beyond the pits in all the specimens black; pits rather large or medium, distinct or confluent, rounded or oval, contained in a shallow groove, which ends midway on the lateral margin; wings hyaline, very slightly infumated at the base of the radial cell; 6–7 mm. long. ♂ ♀.

Montana; twelve specimens. A very beautiful and distinct species.

Chrysis dorsalis n. sp.—From dark blue, purple and green, to emerald-green and no purple; head and thorax closely and equally punctured; basin of face smooth in the middle, very finely punctured on each side; abdomen closely and about equally punctured, the punctures becoming a little confluent and slightly larger on the apical half of third segment; on the basal three-fourths of the dorsum of each segment of a deeper and duller color, black in the green specimens, purplish black in the blue; pits medium, or a little large, round, separated, contained in a shallow groove, which ends midway on the lateral margin; some specimens differ from the figure (plate 9) by having the median teeth as far apart as the median and outer teeth, and somewhat pointed; wings hyaline, infumated on the basal half, in one specimen fusco-flavescent; 6–7 mm. long.

Colorado, California, Washington Territory, Montana and Vancouver's Island; ten specimens.

Chrysis montana n. sp.—Blue with emerald-green to emerald-green with a little blue; head and thorax closely and evenly punctured; basin of face smooth, punctured on each side; abdomen with the punctures very little separated, almost as close as on the thorax, larger on the sides and towards the apex of third segment; pits large, shallow, slightly separated, forming a large, distinct, though shallow groove, which extends midway on the lateral margin; wings almost clear hyaline; 6 mm. ♀.

Montana; two specimens.

Chrysis Frey-Gessneri Gribodo, Ann. Mus. Genov. xiv, p. 333, 1879.

Three specimens from New York, Texas and Washington Territory. Gribodo's description is as follows:

"Of moderate size, slender, cylindrical, not very bright, obscurely green; head and thorax very densely and irregularly punctured and subcoriaceous (scutellum and postscutellum punctured and reticulated); abdomen closely and regularly punctured; head, viewed in front, rounded, quadrate; facial cavity large, not deep, margined above and at the sides; postscutellum rather flat and sloping; abdomen nearly as broad at apex as at base, a little longer than head and thorax together; third segment entirely uniformly convex on all sides, *i.e.* the anteapical series entirely wanting, and the anal area not immersed, but on the contrary forming in the same position a very large and deep erose fovea, interrupted in the

middle, and conspicuously biarcuate; anal margin quadridentate, the robust teeth prolonged, acutely triangular subequal, emargination arcuate, equal; wings slightly sordid, perfectly hyaline on the limb. Length 7 mm. Texas."

Varies from 7–8.5 mm. The color is emerald-green with some blue reflections; basin of face very finely and narrowly striate. Gribodo is hardly correct and a little difficult to understand when he says: "anteapical series entirely wanting," but farther on he explains, "forming in the same position a very large and deep erose fovea," which means in the same position as the anteapical series of pits. This fovea, which being "interrupted in the middle," forming two, is nothing more than the two median pits greatly enlarged, becoming confluent with the others and disturbing the evenness of the posterior margin of basal area of segment, causing it to be arched. The size of these large pits, however, varies, and in one specimen hardly cuts the before mentioned margin. The apical teeth also vary in length.

Chrysis hirsuta n. sp.—One specimen deep blue with dull purple reflections, the other green and blue with black and dull purple on the dorsum of the second abdominal segment; head, thorax and abdomen densely and equally punctured; in one specimen the punctures on the dorsum of the second segment becoming largely confluent, or running together in rows; basin of face finely punctured on each side (best seen in certain directions and light) with long coarse white hairs; pits very large and confluent in a rather deep groove, which ends midway on the lateral margin; teeth unusually long and slender and much turned down; wings clear hyaline; 4.5–6 mm. ♂ ♀.

Montana and Utah; two specimens.

Chrysis pellucidula n. sp.—Green and blue, deep purple and black on the dorsum of the second abdominal segment and a little deeper blue on the first segment; basin of face punctured; head and thorax densely and equally punctured; abdomen with the punctures separated, especially so in the second segment, closer and a little confluent on the sides of the third segment; pits very large, confluent, luteous and when held towards the light somewhat transparent; the median separation very narrow; apical margin abrupt, sharp; teeth coming to sharp points; wings hyaline, very slightly infumated; 5.5 mm. ♀.

Virginia; one specimen.

Chrysis Pattoni n. sp.—Emerald-green with blue reflections; basin of face punctured; head and thorax with the punctures rather fine, dense and equally distributed; abdominal punctures hardly separated, about equal, close and a little confluent on the third segment; pits medium, rather indistinct, dark colored, the groove moderate, ending near the base of segment, a little raised above the pits on its anterior border at the extreme dorsum; apical margin not very abrupt; wings rather strongly infumated nearly to the apex; 6 mm. ♀.

Colorado; one specimen. The figure gives only the lateral view of third segment; as seen from above it exactly resembles fig. 64, same plate.

Chrysis venusta Cresson, Proc. Ent. Soc. Phila. iv, 311, 1865.

Three specimens in the collection from Colorado (the type), Arizona and Texas. One specimen with the first abdominal segment partly and the second with all but a narrow space on the posterior margin showing black, with a faint tinge of purple; the teeth vary; plate ix, fig, 61, illustrates the type specimens, while another specimen has the median teeth closer together than those figured; 6–8 mm. ♀.

Chrysis nitidula Fabr., Ent. Syst. ii, 243, 21, 1793; Dahlbom, Hym. Eur. ii, 214.

Twenty specimens in the collection from the following localities: Massachusetts, Pennsylvania, Delaware, Lake Superior region, Canada, in the collection of M. Provancher. The general color is blue with green reflections and some purple. Two specimens have the head and thorax emerald-green with very little blue and the abdomen blue only on the first and second segments. All the specimens but those from Oregon (Mt. Hood) have cupreous, scarlet, golden and green reflections (in appearance like the colors of the spectrum) in a line, bordering the posterior margin of the anterior area of the third segment, just above the pits. A variety, represented by two specimens have Colorado, has the entire third segment uniformly cupreous with a dull, even purple tint. A specimen from Massachusetts has this color distinct only in certain lights; in other lights the segment is green or blue. The specimens from Mt. Hood, Oregon, have also the margin directly above the pits a little swollen or lobed in the extreme middle, and though the form of the apical teeth are the same it may be a distinct species. Head, thorax and abdomen for the most part densely punctured, the punctures finest on the third segment, largest on the metathorax and the first abdominal segment, separated on the sides of the first segment and the apical portion of the second. Pits medium, distinct, contained in a moderately strong groove, ending nearer the base of segment. Apical teeth seem to be quite constant in form and relative distance. The central emargination, as shown in the figure, is broader and less profound than the lateral ones. ♂ ♀.

Chrysis cœrulans Fabr., Piez. 173, 1804; Dahlbom, Hym. Eur. ii, 212, pl. xi, 110; Radoskovsky, Horæ Soc. Ent. Ross. iii, 305, pl. iv, fig. 19.

Chrysis nitidula Brullé, Nat. Hist. Ins. Hym. iv, 38.

Chrysis cœrulans (Lep.) Brullé, loc. cit. 37.

Chrysis bella Cresson, Proc. Ent. Soc. Phila. iv, 312, 1865.

The collection contains forty specimens, all of which, after careful examination, I have decided to place with this species. The localities are Canada, Maine, Massachusetts, New Jersey, Delaware, Virginia, North

Carolina, Georgia, Kentucky, Illinois, Wisconsin, Colorado, California, Oregon, Washington Territory and Vancouver's Island. The variations in the apical teeth are best shown by the figures; other specimens, including *bella* of Cresson, resemble *Nortoni*, while several agree with Dahlbom's figure and description. The color is blue, with more or less green and some purple reflections; some specimens are deep blue with much purple, others entirely emerald-green with no blue; basin of face punctured; head and thorax densely punctured; abdomen with the punctures more or less separated, close on the dorsum of the second segment in some specimens, in others separated. One or two specimens have a few scattered finer punctures between the larger ones on first segment. The lateral view of the third segment, the pits and the groove, as in *nitidula*. Radoskovsky's figure gives an excellent idea of the species.

Chrysis inflata n. sp.—Head and thorax emerald-green with more or less deep blue reflections, closely and equally punctured; basin of face punctured; abdomen emerald-green with deep blue and some dull purple on the dorsum, the blue more or less broadly diffused, sometimes covering a larger part of the second and third segments; abdominal punctures close and about equal; pits medium, rounded, distinct, contained at the bottom of a deep declivity which forms the anterior margin of the groove, and which is somewhat swelled, reaching a little towards the apex and overhanging the lateral margin nearly or quite to the base of the segment; teeth strong; wings hyaline, slightly infumated; 6–9 mm. ♂ ♀.

Southern California, Colorado and Utah; eight specimens. In one specimen the swelling above the groove is much exaggerated.

Chrysis Nortoni n. sp.—From deep blue with green and slight purple reflections to emerald-green with very little blue; head and thorax densely and equally punctured; abdomen with the base of the second segment and sometimes the third blue, or darker green; punctures a little separated, about equally distributed, in some specimens close on the dorsum and others with finer punctures scattered among the larger, on portions of the first segment; pits small, subdistinct and rounded, or sometimes somewhat confluent, contained in a medium groove, which ends near the base of the segment; teeth greatly turned down; wings hyaline, slightly infuscated; 6–9 mm. ♂ ♀.

Canada, Maine, Pennsylvania, Illinois, Colorado, Montana, Washington Territory, Oregon; seventeen specimens. The apical teeth vary, some specimens have the outer and median teeth much farther apart than the median, and *vice versa*.

Chrysis peracuta n. sp.—Blue and green with dull purple reflections; basin of face striated; head and thorax densely and equally punctured; abdominal punctures somewhat separated, largest on the first segment, close on the third; pits medium, or a little large, distinct and close, in a shallow but distinct groove, ending on each side near the base of segment; wings hyaline on the extreme margin, broadly infuscated on the middle and somewhat towards the base; apical margins are thin, sharp, the teeth pointed; 8–10 mm.

Kentucky, Georgia, Florida; four specimens. In the form of the margins and in the general shape of the third segment the species is allied to *C. fasciata* Fabr., from Mexico, but differs by having distinct pits contained in a deep groove. The abdomen of this species is considerably longer than the head and thorax combined.

Chrysis tripartita n. sp.—Head and thorax, with the metathorax and abdomen, emerald-green with very slight dull blue and darker green reflections; mesothorax deep blue with slight dull purple reflections; basin of face very narrowly striated; closely and about equally punctured all over, on the abdomen the punctures a little more separated; posterior surface of the postscutellum as viewed laterally not evenly rounded, but angled and almost projecting; pits medium, rounded, distinct, in a shallow groove that ends about midway on the lateral margin, or a little nearer the base of segment; apical teeth short, broad, round at the apices, the median teeth somewhat longer than the outer, much closer together and separated by a deeper emargination than the median and outer teeth; lateral margins about straight; wings infuscated, paler on the outer margin; 10.5 mm. long. ♀.

Arizona; one specimen. The position of the apical teeth resembles that of *C. pelucidula*, plate ix, fig. 58. The deep blue mesothorax divides the anterior and posterior portions of the insect, which are bright green, into three parts of color; a very odd character.

Chrysis propria n. sp.—Green with slight blue reflections, some specimens with distinct brassy reflections; basin of face striated; head and thorax closely and evenly punctured; abdomen with the punctures varying in different specimens, in some close and equally distributed, in others separated and with finer punctures scattered between; punctures close on the third segment in all the specimens, in some subconfluent; pits medium, in one specimen a little large, distinct, rounded, within luteous, semi-transparent when held against the light; groove shallow and with the pits ending on the lateral margin near the base of the segment; wings almost clear hyaline, a little infumated, in some specimens the radial cell is infuscated; 6–7.5 mm. ♂ ♀.

Montana, California, Colorado and Arizona; eight specimens.

Chrysis lauta Cresson, Proc. Ent. Soc. Phila. iv, 310, 1865.
Chrysis prasinus Cresson, loc. cit.
Chrysis pulcherrima Cresson, loc. cit. 311.

Eleven specimens; the localities are Washington Territory, California, Colorado, Arizona and Texas. The varieties (all of which we have in the collection together with the gradational forms) are shown in Mr. Cresson's excellent descriptions. We have not one of the three types in the collection; however, the descriptions agree perfectly. The median space of the mesothorax in *prasinus* being deep blue and black is very odd, but it cannot be considered a constant or important character. Our specimen of *prasinus* proper is from Arizona, not from Colorado. One specimen of *lauta*, from Colorado, is emerald-green with very bright

golden and brassy reflections with the median space on mesothorax anteriorly black in the middle. An extreme variety from Texas is deep blue with very little green. Basin of face in some specimens narrowly striated or smooth, in others broadly striated. In *pulcherina* the appressed white pubescence on each side of the face is not a constant character, as specimens have to a less degree, and in some it is wanting altogether. Pits small or moderate, distinct or confluent, rounded or oblong, contained in a distinct, sometimes shallow groove, ending midway on the lateral margin. In one specimen the pits are entirely confluent, forming a broad, deep sulcus upon the surface; 7–10 mm.

This is the most variable species belonging to the genus *Chrysis* with which I am acquainted, but the variations are not fairly correlated and are gradational, and therefore cannot properly separate the forms.

G.—Apical margin of the abdomen *sexdentate*.

Abdomen closely (often densely) punctured on the dorsum, the punctures sometimes a little more separated on the sides.

Lateral margins of third segment strongly arched outwardly towards the base and sinuate just before the outer teeth..... **texana.**

Lateral margins of third segment broadly sinuate or arched inwardly; pits contained in a deep groove, caused by the swelling of the posterior margin of the anterior area..... **clara.**

Lateral margins slightly bisinuate, straight or bowed outwardly, the pits contained in a moderately shallow groove, the margin of area not swelled.

The larger separated punctures on the sides of the first and second abdominal segments with the intermediate spaces mostly smooth, perhaps a very few smaller punctures here and there..... **intricata.**

The larger separated punctures on the sides of the first and second segments with the intermediate spaces rather closely beset with finer punctures. **sexdentata.**

Abdomen with the dorsal punctures sparse, well separated.

Punctures on the third abdominal segment nearly equal over the entire surface. **pennsylvanica.**

Punctures on the middle of the posterior portion of the anterior area of third segment, just above the pits, very small and dense as compared with the rest..... **smaragdula.**

Chrysis texana Gribodo, Ann. Mus. Genov. xiv, 329, 1879.

Four examples from Texas. Following are most of the essential points from Gribodo's description, it being too long to give verbatim:

Green, not very bright; head and thorax very closely, abdomen more sparsely punctured, all the punctures of moderate size, but the first segment of abdomen more heavily punctured; abdomen scarcely longer than the head and thorax taken together, perfectly cylindrical, apex as broad as base; anal margin sexdentate, teeth robust, triangular, somewhat equal; emarginations quite variable in form in different specimens, but always nearly equal in size; wings subhyaline, infumated.

♀.— Anterior area of the third dorsal segment of the abdomen sometimes slightly depressed, a little thickened and swelling above the anteapical series; anal margin low.

♂.—Larger, less punctured and the third dorsal segment of abdomen, both on the anterior area and the anal margin showing on both sides the same moderately convex surface (that is to say the anterior area before or above the anteapical row not elevated, nor thickened, nor swelling, and the anal margin not depressed nor low, the foveolæ of the series large, irregular and confluent, forming a broad and deep, transversely curved fovea. Texas. Length 8–11 mm.

The color is green, with more or less blue reflections, deepest on the dorsum of abdomen; a few scattered fine punctures between the larger separated punctures on the base of the first abdominal segment. The median teeth are twice as long as the outer teeth and longer than the second pair, but they are all equal in position, and I think that is the meaning that the above description intends to convey. Basin of face narrowly smooth, or with very fine striations in the middle. The pits in two specimens are distinct, moderate and with the shallow groove ending the base of segment. In another specimen the pits are subconfluent, and in the remaining specimen are entirely confluent on each side of the dorsum, divided in the middle and distinct and separated above the lateral margin. All of my specimens are males and agree with the description of Gribodo, but has he not taken the following species, *clara*, which is found in Texas, for the ♀ of his *texana?* The teeth and general appearance are much alike, but male specimens of *clara* have been found to agree with the females, and are almost certainly distinct from *texana;* and, furthermore, I am inclined to believe that the true female of *texana* will resemble the male in the structure of the third segment.

Chrysis clara Cresson, Proc. Ent. Soc. Phila. iv, 313, 1865.

Nine specimens from Washington Territory, Colorado, Arizona and Texas (the specimen from Colorado is the type). The color varies from emerald-green with bright brassy reflections to darker green with blue reflections. Basin of face punctured, a smooth space in the extreme middle. The larger punctures on the basal portion of the first segment with the space between them having scattered, finer punctures, also a patch of finer punctures on each side of the dorsum of the first segment. The swelling of the posterior margin of the anterior area is more exaggerated in some specimens than in others, and somewhat overhangs the pits. Pits rather large, distinct, rounded, in some specimens subconfluent; the groove ends on the lateral margin near the base of segment. The apical teeth vary slightly in position, the general form as seen from above resembles the figure of *smaragdula*. The figure representing this species is drawn from the type specimen; 10 mm. ♂ ♀.

Chrysis intricata Brullé, Nat. Hist. des Ins. Hym. iv, 25, 1846.

Seven specimens in the collection; from the localities Iowa, Georgia, Texas, Arizona, California and Dakota. From deep blue with very slight green reflections to dark green with blue and bright green reflections. Basin of face punctured, in some specimens with a narrow smooth space in the extreme centre. Head and thorax densely punctured, the punctures here and there confluent. Abdomen punctured rather closely, except on the first segment and the sides of the second, where the punctures are larger and separated. In one specimen the punctures are uniformly close and equal over the entire surface of the abdomen, in another they are larger on the extreme base of the first segment, but close. In a greater number of the specimens there is a patch of close, finer punctures on each side of the dorsum of the first segment. Pits medium, distinct, or subconfluent in certain specimens. Posterior margin of anterior area of third segment not swelled, but sometimes a little advanced, or sublobed in the middle. The groove not deep, but distinct, ending on the lateral margin quite near the base of segment, one specimen with the pits semi-transparent, luteous, the same color spreading upon the apical portion of the lateral margin and coloring slightly the apical margin. There is little variation in the position of the apical teeth; some specimens have the outer teeth blunt, less produced. Wings in one specimen clear hyaline, in the others infuscated or infumated; 8–9.5 mm. ♂ ♀.

Chrysis sexdentata Fabr., Ent. Syst. Suppl. 258, 20, 1798; Brullé, Nat. Hist. des Ins. Hym. iv, 25 (?); Dahlbom, Hym. Eur. ii, 324.

One specimen from Georgia. I am almost sure about the determination from Brullé. I have supposed it to be the Fabrician species. It is difficult to determine whether Dahlbom describes the same species or not. The punctures of the head and thorax are large, very dense, but only here and there confluent. Basin of face punctured. The abdominal punctures are largest and separated on the first segment, and together with the punctures on the sides of the second have finer punctures between them. A patch on each side of the dorsum of first segment closely and finely punctured; the entire dorsum of the second segment and all of the third with rather close, small, equal punctures. Pits numerous, small, round, distinct, seemingly deep, contained in an equal shallow groove, ending on each side near the base of segment. The apical teeth are about equal in position, the median ones largest, and the emarginations between them deepest; the second pair are more acutely pointed, the emarginations rounded; the outer teeth scarcely deserve the

name, being but very slightly produced angles. In this last character alone the species does not resemble *sexdentata* as described, but the form of the outer teeth in all the species varies considerably in form, and probably this is an extreme form. The lateral margin is straight. Wings hyaline, a little clouded; 10 mm. The specimen is rather long and slender, hardly tapering at the apex.

Chrysis pennsylvanica (Lep.) Brullé, Nat. Hist. des Ins. Hym. iv, 24, 1846.

One specimen from Florida (Philadelphia, Brullé). Deep blue with dull purple and bright green reflections, elegant reddish purple on the abdominal sutures. Basin of face punctured, a narrow, smoothed space in the centre. Head and thorax with the punctures somewhat separated, with some scattered finer punctures on the prothorax. Abdominal punctures well separated, equal. Pits rather large, deep, somewhat confluent on the dorsum, distinct and separated on the sides; pits forming the groove, which ends on each side near the base of segment. Wings subhyaline, a little clouded, the nerves somewhat rufescent; 10 mm. ♂. The mesothoracic interlobular lines are called crenulated, by Brullé, on account of being cut by the punctures.

Chrysis smaragdula Fabr., Ent. Syst. ii, 239, 1793; Dahlb., Hym. Eur. ii, 337.

Five specimens from the localities: Pennsylvania, Delaware, North Carolina, Florida and Kentucky. From emerald-green with blue reflections to deep blue and purple with green reflections; the abdominal sutures bright reddish purple. Basin of face punctured, a little smoothed in the centre. Head and thorax closely punctured, on some portions the punctures are very slightly separated. Abdomen with the punctures about equal and equally separated over the entire surface of the first and second segments; third segment with the punctures a little smaller and closer; a patch of fine, close punctures on the middle of the posterior margin of the anterior area just above the pits. Pits rather large, shallow, distinct, in some specimens; in others subconfluent on the sides forming the rather shallow groove which ends on the sides near the base of segment. The apical teeth vary somewhat in relative position in different specimens. Wings subhyaline; 13–15 mm. The largest North American species representing this genus.

Chrysis inæquidens Dahlb., Hym. Eur. ii, 334, 1854.

This species is not in the collection and is unknown to me. Dahlbom's description reads as follows:

"Of moderate size, two and two-thirds lines. Habitat—New York. A single specimen. Almost the size of *Chrysis nitidula* ♂, the body of moderate size as to thickness, above green-blue, the head in front, pectus, and feet green, the venter strongly vaulted, for the most part concolorous; tarsi fuscous; head and thorax closely but moderately punctured; facial cavity of the head rectangular, punctured, cariaceous, of moderate size, margined above, transverse margin unequal, subarcuate; antennæ of moderate size, fuscous, green at the base; clypeus short, transverse, punctured, convex on the disc, slightly arcuate; emarginate at the centre of the apical margin; mandibles piceous, greenish at the base; thorax thick, subquadrate-cylindrical, quite convex on the dorsum; posterior lateral angles of the metanotum robust, triangular; margins of the mesopluræ obsoletely crenulated; abdomen of moderate size, of the length of the head and thorax taken together, obtusely rectangular, quite convex on the dorsum and very densely punctured; each lateral intramarginal area of the first dorsal segment cuneiform, sprinkled with thick punctures, arranged almost alternately, margined, slightly concave; third dorsal segment short, entirely depressed, convex; anteapical series with numerous, rounded, unequal foveolæ, that is to say, larger, of moderate size and small; apical teeth acutely triangular, unequal in size, the two intermediate ones larger and more robust, the two secondary ones of moderate size, the two external ones shorter and a little broader; emarginations also unequal, the central one large, triangular, deep; the secondary ones of medium size, moderately and somewhat obliquely arcuate, the two external ones small, also obliquely arcuate."

Evidently very distinct. Is it not possible that the locality may be erroneous, and that this is not a North American species?

STILBUM Spinola.

Ins. Ligur. i, 9, 1806.

The genus is sufficiently characterized in the generic key. As far as our present knowledge of the North American species extends *Chrysis* and *Stilbum*, while having many characters in common or in close resemblance, have also a correlation of differences that show them to be quite distinct and very strongly marked genera. How they may approach each other by the modifications of *exotic* species, I have had no means of determining.

Stilbum amethystinum.

Chrysis amethystina Fabr., Syst. Entom. ii, 359, 1793.
Stilbum splendidum Brullé, Hist. Nat. des Ins. Hym. iv, 15; Dahlb., Hym. Eur. ii, 358, pl. xii, fig. 114 (not Fabricius).
Stilbum calens Spin., Ins. Ligur. i, 19, 1806; Brullé, loc. cit. 16; Dahlb., loc. cit. 360; Radoskovsky, Horæ Soc. Ent. Ross. iii, 308, pl. vi, fig. 35.
Stilbum Wesmaeli Dahlb., loc. cit. 359, plate xii, fig. 115, 1854.
Stilbum amethystinum Smith, Trans. Ent. Soc. Lond. 470, 1874.

A single specimen from Ontario in M. Provancher's collection. It agrees perfectly with Dahlbom's figures, etc., and with Brullé's descriptions. For its differing from the true *S. splendidum*, of Fabricius, I take Smith's determination. This specimen may be described as follows:

♀.—Deep chalybeous and purple, the third abdominal segment entirely metallic purple; basin of face cross striated, above a large foveolæ enclosing the anterior ocellus, and caused by the upward continuation of the carina across the front; prothorax with the surface uneven, much wider at the sides than in the middle, with large shallow punctures; mesothorax with the punctures moderately strong directly and on the posterior portion of the median division, but on the dorsum, becoming more shallow separated depressions; tegulæ small, oval, almost smooth; metathorax with larger and deeper punctures than the other portions of the insect; prolongation of the postscutellum deeply excavated above (the excavation deeper than in Dahlbom's figure); abdomen with the second segment three times as long on the dorsum as the first segment, the first sharply angulated at its anterior corners, flattened on the sides; second segment with the lateral margins extremely short as compared with the dorsum; third segment with the depression very deep and broad; the pits eighteen or twenty, distinct, rounded, seemingly deep, situated at the bottom of a perpendicular declivity; the apical teeth, four in number, large, pointed, the two median ones projecting beyond the others, but with the central emargination smaller and narrower than those between the median and outer teeth; lateral margins arched outwardly, a little sinuate just before the outer teeth; entire abdomen with small, round, very much separated punctures on a smooth surface; those on the last segment very much smaller except at the extreme base, where they are large and close; femora and tibiæ entirely blue, the tarsi tinged with green, the basal half of the brown antennal joints tinged with green; 15 mm. long.

Sub-family—PARNOPINÆ.

PARNOPES Fabr.

Syst. Piez. 177, 1804.

This genus stands by itself and is very widely separated. The characters are those of the sub-family. It may be at once distinguished by the lengthened bee-like proboscis. The male has four abdominal segments and the female three, the apical segment being longer in the female.

Postscutellum with its posterior margin entire.....**Edwardsii.**
Postscutellum with its posterior margin deeply notched in the middle (according to Smith's description.....**chrysoprasina.**

Parnopes Edwardsii.

Euchroeus Edwardsii Cresson, Trans. Am. Ent. Soc. vii, Proc. Ent. Section 1879, p. iv.
Parnopes Edwardsii Cresson, loc. cit. page x.

The color varies from emerald-green with golden or brassy reflections to deep blue and purple with some green reflections; two specimens from Vancouver are dull colored, partly fuscous on the thorax, the single male specimen is deep blue. One Californian specimen has strong cupreous

and golden reflections on the pro- and mesothorax. Projection of the postscutellum quadrate, straight and entire on its posterior margin. The many small apical teeth are fine and sharp.

California and Vancouver's Island; seven specimens including the types.

Parnopes chrysoprasina Smith, Trans. Ent. Soc. Lond. 454, 1874.

Not known to me. I give Smith's description in full. The species will probably be found in other localities besides that mentioned.

"Male.—Length four and a half lines. Green, with the basal margins of the second, third and fourth segments blue; head, thorax and abdomen closely and strongly punctured, the thorax rather more strongly so than the head or abdomen; antennæ rufo-testaceous, one or two of the basal joints tinged with green; the legs rufo-testaceous, the femora darkest, and, as well as the tibiæ, tinged with green; the tegulæ strongly punctured, tinged with green, and having their outer margin pale testaceous; wings pale fulvo-hyaline; the postscutellum nearly quadrate, a little longer than broad, deeply notched in the middle of the posterior margin; the apical segment with two large, deep foveæ near its apical margin, which is denticulated.

"Hab.—North Carolina."

A partial list of the more important writings on the CHRYSIDIDÆ.

Abeille de Perrin.—Syn. Critique et Synonymique des Chrysides de France. Ann. Soc. L. Lym. xxxvi, 1880, p. 1, pl. 1–2.

Brulle.—Hist. Nat. des Ins. Hyménoptères, vol. iv (Suites á Buffon), 1846.

Cresson.—Proc. Ent. Soc. Phila. iv, 1865, p. 103, p. 105, p. 303 (new species).

" Trans. Am. Ent. Soc. vii, 1879, pp. iv and x of the Monthly Proceedings (new species).

Dahlbom.—Hymenoptera Europæa, vol. ii, Chrysis, 1854 (many very fine plates with details).

Gribodo.—Ann. Mus. Genov. vi, 1875, p. 359 (new species).

" Ann. Mus. Genov. xiv, 1879, p. 329 (new species).

Norton.—On the Chrysides of North America, Trans. Am. Ent. Soc. vii, 1879, p. 233. Considers only the Genera Elampus (= Omalus Elampus and Notozus in one), Holopyga, Hedychrum and Chrysis (the 4 and 6 dentate species not studied).

Patton.—Canadian Entomologist, xi, 1879, p. 66 (four new species described).

Provancher.—Petite Faune Entomol. du Canada, Naturaliste Canadien, vol. xii, 1880–81, p. 300 (six new species).

Radoskovsky.—Catal. Chrys. Russia, with many fine plates. Horæ Ent. Soc. Rossicæ, iii, p. 225.

F. Smith.—Trans. Ent. Soc. London, 1874, p. 451 (revises certain genera and describes new species).

Tachenburg.—Hymenoptera Deutschlands, p. 148 (tabulates nine genera).

EXPLANATION OF PLATES.

PLATE VI.

Fig. 1. Cleptes insperatus.
" 2. " " lateral view of abdomen.
" 3. Omalus iridescens, third abdominal segment.
" 4. " diversus, " "
" 5. " læviventris.
" 6. " " third abdominal segment.
" 7. " " tarsal claw.
" 8. " sinuosum, third segment.
" 9. " coruscans, third segment.
" 10. " " pro- and mesothorax and scutellum.
" 11. " " tarsal claw.
" 12. " semi-circularis, third abdominal segment.
" 13. Elampus variatus, pro- and mesothorax and scutellum.
" 14. " " third abdominal segment, as viewed posteriorly, showing the notch of the apical projection.
" 15. Elampus variatus, third abdominal segment, viewed laterally.
" 16. " Cressoni.
" 17. " speculum.
" 18. Diplorrhos plicatus, third abdominal segment, lateral view, showing the two apices and the submarginal fold.
" 19. Notozus versicolor, third abdominal segment, viewed posteriorly, showing the apical notch and its closing membrane.
" 20. Notozus versicolor, third abdominal segment, viewed laterally.
" 21. " viridicyaneus, third abdominal segment.

PLATE VII.

Fig. 22. Notozus marginatus, third abdominal segment.
" 23. " productus.
" 24. " " third abdominal segment.
" 25. " seminudus.
" 26. Hedychrum obsoletum.
" 27. " violaceum, posterior view of the postscutellum, showing the median ridge and the foveolæ.

Fig. 28. Hedychrum violaceum, tarsal claw.
" 29. " continuum, posterior view of the postscutellum, showing the following punctured area.
" 30. Hedychridium dimidiatum, posterior view of the postscutellum.
" 31. " " second and third abdominal segments.
" 32. " " tarsal claw.
" 33. " cæruleum, posterior view of the postscutellum.
" 34. Holopyga ventralis, tarsal claw.
" 35. " horus.

PLATE VIII.

Fig. 36. Chrysis verticalis, anterior view of head.
" 37. " " third abdominal segment.
" 38. " inusitata, anterior view of head.
" 39. " optima, third abdominal segment, showing the prolongation of the fourth segment and the apex of the ovipositor.
" 40. Chrysis inusitata.
" 41. " hilaris, metathorax.
" 42. " tota, third abdominal segment.
" 43. " perpulchra, third abdominal segment.
" 44. " densa, " "
" 45. " discreta, " "
" 46. " parvula, lateral view of mesothorax, showing prolongation of postscutellum.
" 47. Chrysis parvula, third abdominal segment.
" 48. " scitula, " "
" 49. Parnopes Edwardsii.

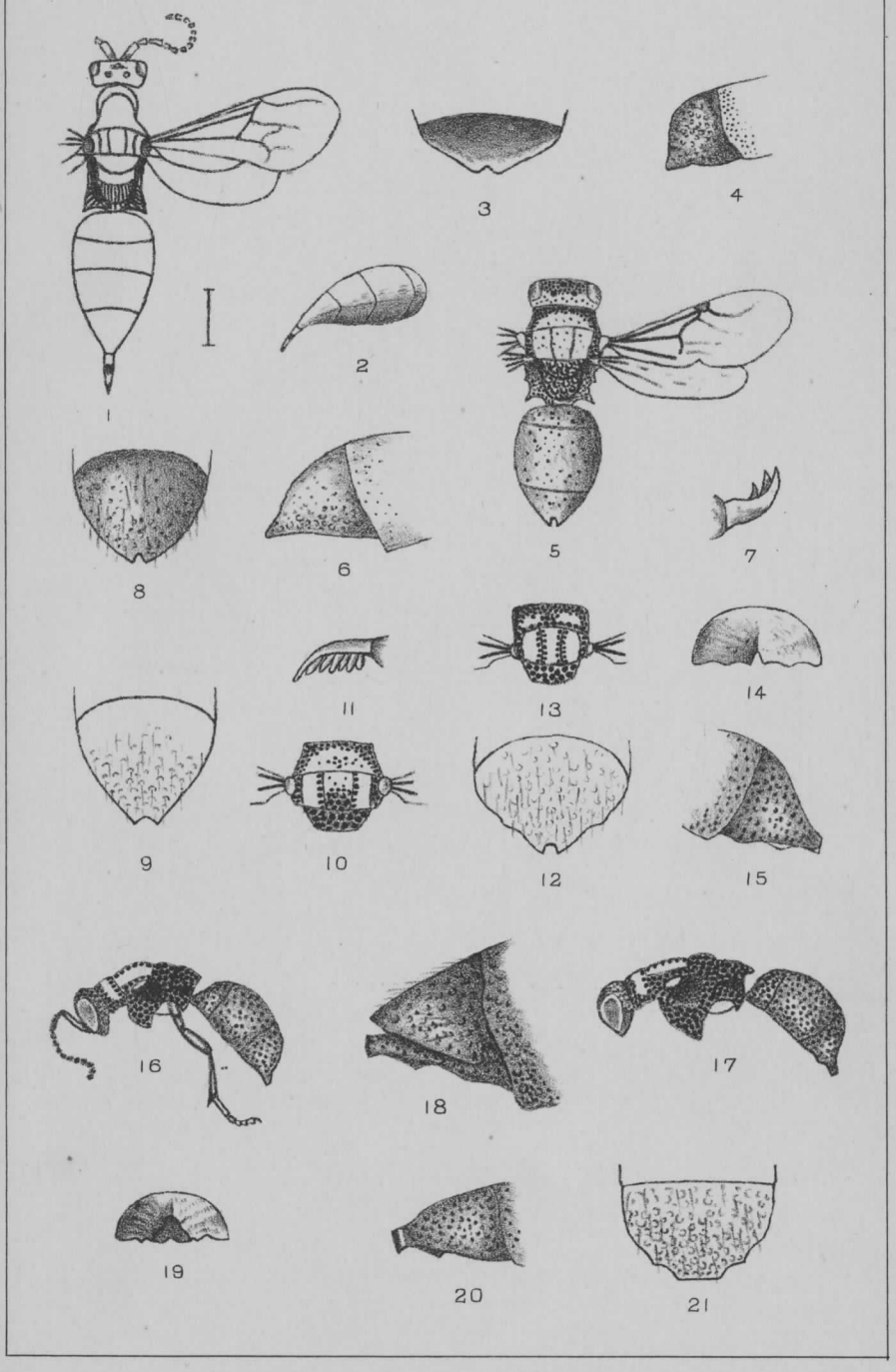
PLATE IX.

Fig. 50. Chrysis Meta.
" 51. " dorsalis.
" 52. " montana.
" 53. " "
" 54. " Frey-Gessneri.
" 55. " "
" 56. " hirsuta.
" 57. " "
" 58. " pelucidula.
" 59. " "
" 60. " Pattoni.
" 61. " venusta.

Fig. 62. " nitidula.
" 63. " "
" 64. " cœrulans.
" 65. " "
" 66. " "
" 67. " "
" 68. " inflata.
" 69. " "

PLATE X.

Fig. 70. Chrysis Nortoni.
" 71. " "
" 72. " "
" 73. " "
" 74. " peracuta.
" 75. " "
" 76. " propria.
" 77. " "
" 78. " lauta.
" 79. " "
" 80. " " var. pulcherima.
" 81. " " " "
" 82. " smaragdula.
" 83. " Clara.
" 84. " intricata.
" 85. " "
" 86. " pennsylvanica.
" 87. " texana.
" 88. Prothorax of *Chrysis* quadridentate, subgenus first division.
" 89. " " " " second division.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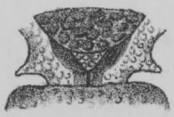

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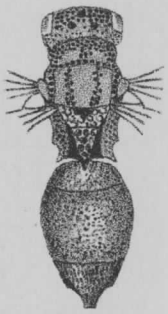

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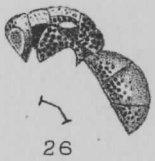

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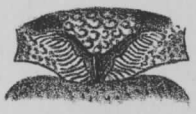

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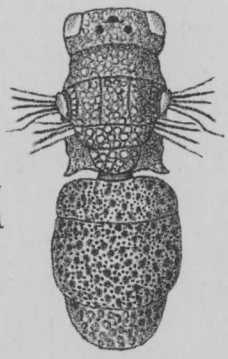

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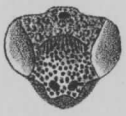

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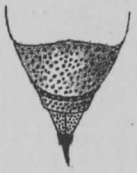

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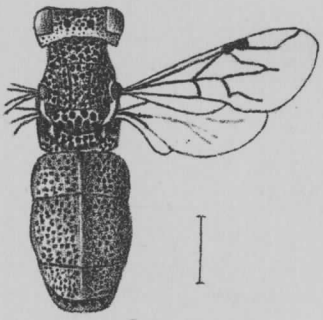

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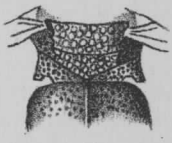

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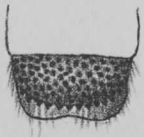

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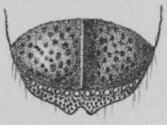

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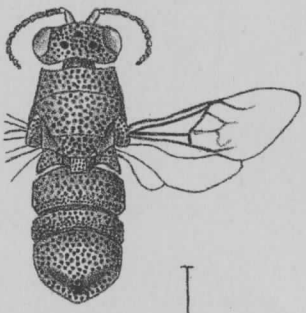

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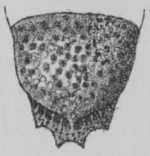

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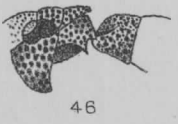

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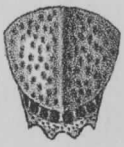
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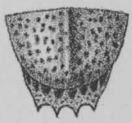
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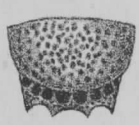
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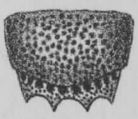
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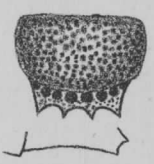
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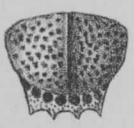
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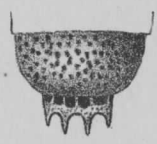
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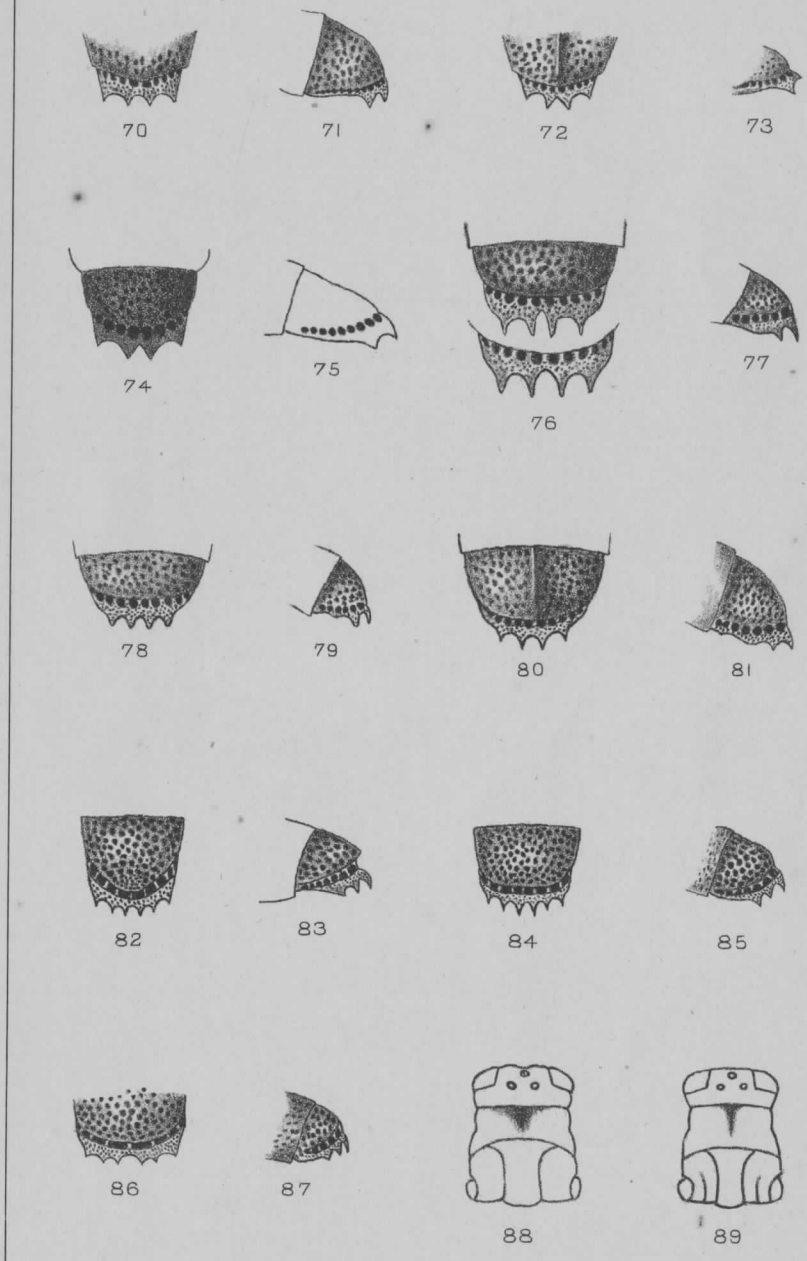
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